

# TED Pro ENERGY MONITORING AND CONTROL SYSTEM

## SINGLE AND THREE-PHASE ELECTRICAL SERVICES WORLDWIDE

### OVERVIEW

The TED Pro Energy Monitoring and Control System is a state-of-the-art system for use in residential, commercial and government buildings and small industrial complexes. The system allows the user to monitor energy usage, thereby managing energy use through awareness of energy use and costs. Energy use and alerts can be presented on a custom display, computer, over the Internet, on mobile devices or by text or email messages. Colored LEDs alert the user to rate-tier changes, high demand, cost or other user-defined parameters.

Optionally, the system can be configured to automatically adjust thermostat settings or turn off loads based on user-selectable criteria such as cost of electricity, total use, cost, time of day, budget, or request from a utility or electric provider.

The system is designed to work on any single or 3-phase electrical system anywhere in the world and is compatible with numerous energy or demand-rate billing systems, including fixed, time-of-use, step/tiered, seasonal, demand, or any combination of those mentioned. The system also accommodates taxes, fixed charges, and fuel surcharges to accurately reflect the monthly electric bill.

The basic system consists of an MTU and an ECC, descriptions of each follow below.

The Measuring Transmitting Unit (MTU) measures the energy consumption, demand, voltage, current, and power factor. We offer three types of MTU depending on the requirements of your electrical system:

- **MTU Pro** is designed for 3-phase systems in small-to-medium size commercial, institutional and industrial environments. It is suitable for any 3-phase system up to 5000A, 600V.
- **MTU Lite** is designed for 3-phase wye systems in small business applications where maximum amperage is 200A and maximum voltage is 277V. It is also ideally suited for residential occupancies with 3-phase services, common in some parts of Europe and South America.
- **MTU Home** is designed for single-phase residential and small commercial use with a maximum amperage of 400A and 240V.

The MTU is generally located at the main electrical panel and transmits the information collected, over the building's existing electrical wiring, using a state-of-the-art Power Line Carrier communication (PLC) to an ECC which receives and interprets the data. Multiple MTUs can be used to give individual measurement of panels or loads. For systems with solar, wind or other generation, multiple MTUs will tell the user consumption, generation and net, from-or-to the utility. For utility-deployment, the MTU can be mounted in a Meter Collar for simple installation without entering the customer's premises.

The Energy Control Center (ECC) is the communication hub for the system. It receives raw energy-use data from the MTU(s), interprets the data and calculates the current energy cost, cost today, month-to-date, etc. The ECC can be configured to communicate with display devices, computers, networks, mobile devices, thermostats, and load control devices via Ethernet, PLC, WiFi, ZigBee, USB, or XBee. System can be configured to send text or e-mail alerts using the free TED Advisor feature.

Multiple ECCs in multiple locations can be monitored via the internet using TED's proprietary AggreData software.

System and Utility Rate setup is simple and intuitive using a PC running our web-based setup wizards. For utilities, rates and setup configuration can be pre-programmed making the entire system plug-and-play. The ECC can also be configured to receive data from a ZigBee Smart Meter.

To this basic system can be added numerous options:

- Multiple MTUs can be added to separately measure various loads or generation.
- **TED Spyder** – The Spyder mounts in, or beside the electrical panel and is connected to the MTU. The Spyder records detailed usage of up to 8 single or multi-phase circuits. These individual readings are stored in the ECC for display. Each TED system can support up to 4 MTUs and 4 Spyders, thus monitoring up to 36 separate loads.
- Multiple systems can be used and the data aggregated at a central location.
- Display Devices
  - Wired-in Display connects directly to ECC.
  - Optional Wireless Display with battery backup can be mounted anywhere or carried around for load checking.
- Smart Thermostats
  - WiFi or ZigBee-based
- Load Shedding Devices
  - PLC, WiFi or ZigBee-based

**ECC (Energy Control Center)**



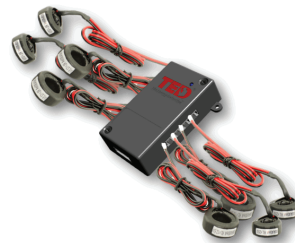
**MTU Pro**



**MTU Lite / MTU Home**



**Spyder**



## How TED Works



# TECHNICAL SPECIFICATIONS

| Measuring Transmitting Units (MTUs) |                                                |                                               |                             |
|-------------------------------------|------------------------------------------------|-----------------------------------------------|-----------------------------|
|                                     | Pro                                            | Pro Lite                                      | Pro Home                    |
| <b>Types of Services</b>            |                                                |                                               |                             |
| Single-phase 2-Wire or 3-Wire       | Yes                                            | Yes                                           | Yes                         |
| 3-phase 4-Wire Wye                  | Yes                                            | Yes                                           | No                          |
| 3-phase 3-Wire Delta                | Yes                                            | No                                            | No                          |
| 3-phase 4-Wire Hi-leg Delta         | Yes                                            | No                                            | No                          |
| Frequency                           | 50/60 Hz                                       | 50/60 Hz                                      | 50/60 Hz                    |
| Maximum Voltage - Phase/Phase       | 600 V                                          | n/a                                           | n/a                         |
| Maximum Voltage - Phase/Neutral     | 347 V                                          | 277 V                                         | 240 V                       |
| Minimum Voltage                     | 180 V                                          | 95 V                                          | 95 V                        |
| Maximum Current - per phase         | 5000A *                                        | 200A                                          | 400A**                      |
| Maximum Wire Size                   | 500 MCM (23mm OD)*                             | 4/0 AWG (15mm OD)                             | 4/0 AWG (15mm OD)           |
| Voltage Measurement                 | Voltage Divider Circuit                        | Voltage Divider Circuit                       | Voltage Divider Circuit     |
| Current Measurement                 | 400A:3V Split-Core CTs                         | 200A:1.5V Split-Core CTs                      | 200A:1.5V Split-Core CTs    |
| Operating Temperature               | -40°C<T <sub>A</sub> <+50°C                    | -40°C<T <sub>A</sub> <+50°C                   | -40°C<T <sub>A</sub> <+50°C |
| Energy Measurement and Calculations | ADE 7854ACPZ                                   | Cirrus CS5461A                                | Cirrus CS5461A              |
| Overall Accuracy                    | *** Better than ± 2%                           | *** Better than ± 2%<br>1-phase, ± 4% 3-phase | *** Better than ± 2%        |
| Measure and Transmit Energy         | ± 1W                                           | ± 1W                                          | ± 1W                        |
| Measure and Transmit Demand         | ± 1VA                                          | ± 1VA                                         | ± 1VA                       |
| Measure and Transmit Voltage        | ± 0.1V                                         | ± 0.1V                                        | ± 0.1V                      |
| Measure and Transmit Phase Currents | ± 0.01A                                        | ± 0.01A                                       | ± 0.01A                     |
| Measure and Transmit Power Factor   | ± 0.1%                                         | ± 0.1%                                        | ± 0.1%                      |
| Communication Interface             | PLC / Ethernet                                 | PLC                                           | PLC                         |
| PLC System                          | Yitran IT700 System                            | Yitran IT700 System                           | Yitran IT700 System         |
| Tested and Approved to:             | FCC Part 15, UL916, CSA C22.2#205, IEC 61010-1 |                                               |                             |

\* Will measure up to 5000A with three 400A parallel feeds using additional CT sets. For systems over 1200A please contact TED Customer Service.

\*\* Will measure up to 400A with two parallel 200A using additional CT set or with optional 400A CT set.

\*\*\* From 1.5% to 100% of Full Scale

| Data-Receiving Units                |                             |
|-------------------------------------|-----------------------------|
|                                     | Energy Control Center (ECC) |
| Works w/ 3-phase & single phase MTU | Yes                         |
| Maximum Voltage Phase/Neutral       | 277 V                       |
| Minimum Voltage Phase/Neutral       | 95 V                        |
| Frequency                           | 50/60 Hz                    |
| Cord Types Available                | UL / EU / UK / AU           |
| Operating Temperature               | +5°C<T <sub>A</sub> <+40°C  |
| Communication Methods Available     | PLC, Ethernet, USB, XBee    |
| USB 2.0 Port                        | 1                           |

| Data-Receiving Device                        |                             |
|----------------------------------------------|-----------------------------|
|                                              | Energy Control Center (ECC) |
| USNAP 2.0 Port                               | 2                           |
| Display Port                                 | 1                           |
| Compatible w/ ZigBee SE 2.0 smart meter      | Yes                         |
| Accept Demand Reduction Request from Utility | Yes                         |
| Maximum number of MTUs on one system         | 4                           |
| Maximum number of Spyders on one system      | 4                           |
| Maximum number of Loads Measured             | 36                          |
| Power-on LED                                 | Blue                        |
| Link Status LED                              | Green / Yellow              |
| Transmit / Receive                           | Green / Red                 |
| Energy-Use Indicator Bar                     | Green / Yellow / Red        |

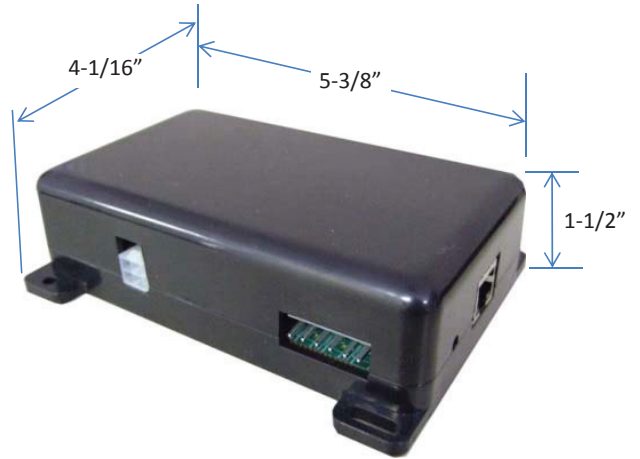
| OPERATIONAL SPECIFICATIONS                                                 |                                      |
|----------------------------------------------------------------------------|--------------------------------------|
|                                                                            | Energy Control Center (ECC)          |
| <b>Software</b>                                                            |                                      |
| TED Footprints™ - Historical, Graphical, Profiling, TED Advisor, Aggredata | Included                             |
| TED Smart Load-Shedding Software                                           | Included - Avail 3 <sup>rd</sup> Qtr |
| System and Utility Rate Setup                                              | Wizard Setup                         |
| <b>Solar / Wind Generation</b>                                             |                                      |
| Display System Load                                                        | Yes                                  |
| Display System Generation                                                  | Yes                                  |
| Display Net Metering                                                       | Yes                                  |
| <b>Data Display Options</b>                                                |                                      |
| Computer - TED Footprints™ Software                                        | Yes                                  |
| Desktop LCD Display                                                        | Yes                                  |
| Wireless LCD Display                                                       | Yes                                  |
| Mobile Phones or Pads                                                      | Yes                                  |
| AggreData - Aggregates data from multiple systems                          | Yes                                  |
| Third Party Applications                                                   | Yes                                  |
| <b>Data Storage / Display</b>                                              |                                      |
| Second Data                                                                | Every second for 2 hours             |
| Minute Data                                                                | Every minute for 48 hours            |
| Hour Data                                                                  | Every hour for 90 days               |
| Day Data                                                                   | Every day for 2 years                |
| Month Data                                                                 | Every month for 24 years             |

|                                    | Energy Control Center<br>(ECC) |
|------------------------------------|--------------------------------|
| <b>Rate Structures</b>             |                                |
| Rates downloadable from Internet   | Yes                            |
| Rates can be pre-programmed        | Yes                            |
| Number of TOU Rates                | 4                              |
| Number of Tier/Step Rates          | 4                              |
| Critical Peak Rates                | Yes                            |
| Weekend Rates                      | Yes                            |
| Holiday Rates (US and Canada)      | Yes                            |
| Seasonal Rates (4 seasons)         | Yes                            |
| Tier/Step within Seasons           | Yes                            |
| Tier/Step within TOU periods       | Yes                            |
| TOU Rates within Seasons           | Yes                            |
| Demand Charges or Demand Penalties | Yes                            |
| Number of House Codes              | unlimited                      |
| Update Time                        | 1 Second                       |

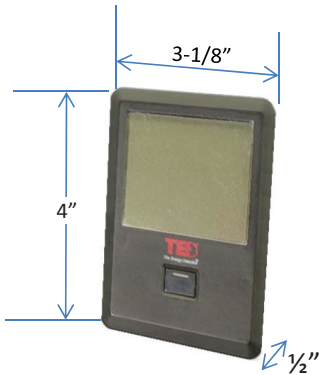
# TED Pro Series Dimensions



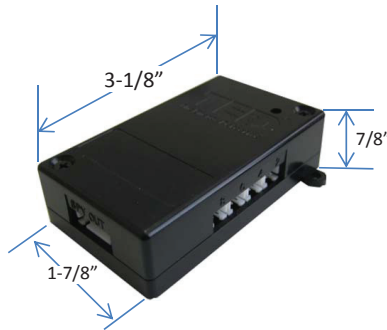
**ECC – Energy Control Center**



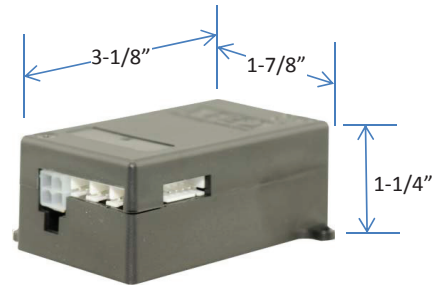
**Pro MTU and MTU-RC**



**Wired and Wireless Display**



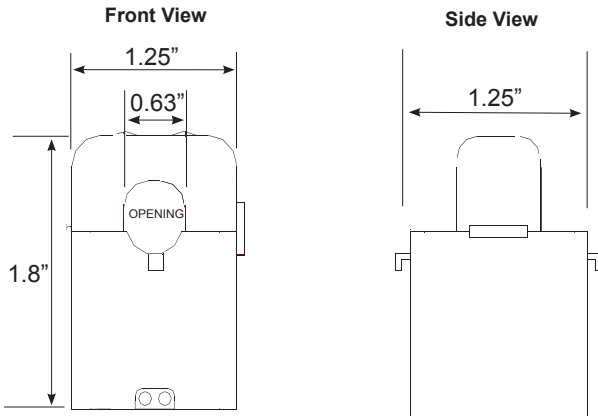
**Spyder**



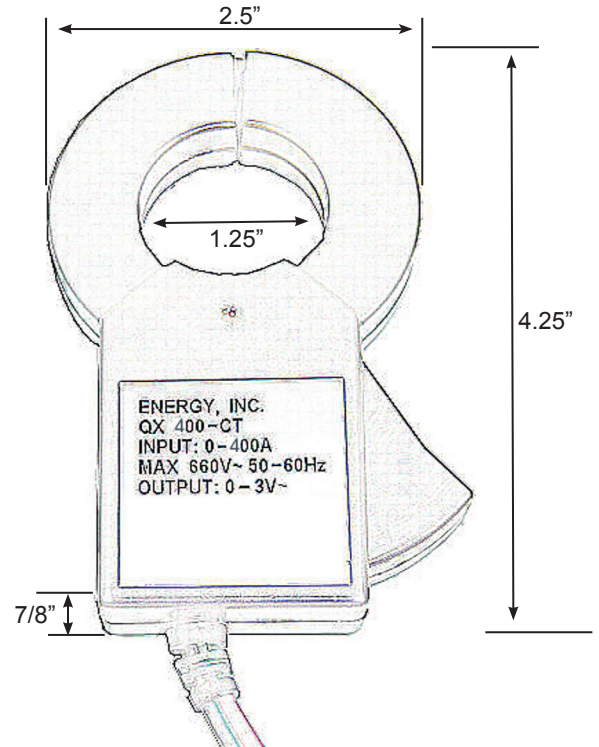
**MTU Home and Lite**

# TED Pro Current Transformers

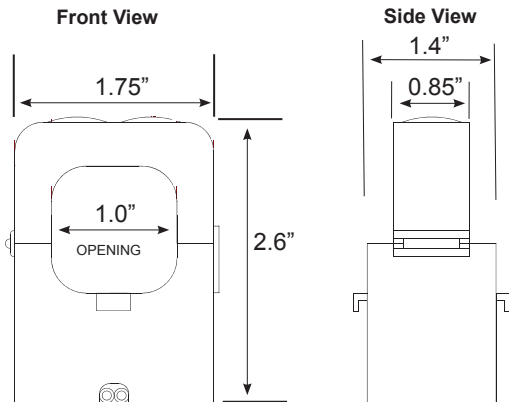
## CT601B - 200A Split-core CT



## CT400XL - 400A Large Split-core CT



## CT301 - 400A Standard Split-core CT

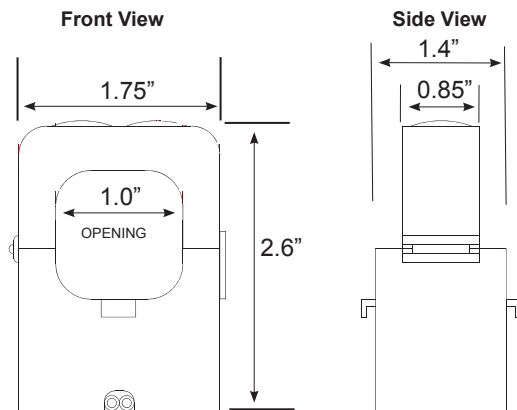


All CT Wire: UL1015 22AWG PVC Wire (600V)



# TED Pro 400A Current Transformers

**CT301 - 400A Standard Split-core CT**



CT Wire: UL1015 22AWG PVC Wire (600V)

**CT400XL - 400A Large Split-core CT**

